

## AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions, and listings, of claims in the captioned patent application:

### **Listing of Claims:**

1-38. (Canceled)

39. (New) An evoked neural response measuring device comprising:

a first implantable subsystem comprising an amplifier having a reference voltage input and a signal input, and an electrode array configured to provide stimulation to the auditory nerve and further configured to generate a response signal corresponding to an evoked neural response of the auditory nerve to the stimulation;

wherein said first implantable subsystem is configured to sample the response signal at a first time to obtain a first sampled value of the response signal, and to provide the first sampled value of the response signal to the reference voltage input, and wherein the amplifier is configured to amplify differences between the response signal and the first sampled value of the response signal at a plurality of times to thereby obtain a changing first output signal representing at least a first portion of an amplified version of the evoked neural response of the auditory nerve.

40. (New) The device of claim 39, wherein the first implantable subsystem further comprises:

an extra-cochlear electrode configured for detection of the response signal, wherein the extra-cochlear electrode works in concert with the electrode array for detection of the response signal.

41. (New) The device of claim 39, wherein the first implantable subsystem is further configured to provide the first sampled value of the response signal to the reference voltage input at the beginning of a first sample period, to sample said response signal at a second time to obtain a second sampled value of the response signal, and to provide the second sampled value of the response signal to the reference voltage input at the beginning of a second sample period.

42. (New) The device of claim 41, wherein the changing first output signal is obtained during the first sample period;

wherein said amplifier is further configured to amplify differences between the response signal and the second sampled value of the response signal at a plurality of times during the second sample period to thereby obtain a changing second output signal representing at least a second portion of the amplified version of the evoked neural response of the auditory nerve; and

wherein said second subsystem is configured to reconstruct at least the first and second output signals into a continuous waveform.

43. (New) The device of claim 41, wherein the first subsystem further comprises:

a sample-and-hold circuit configured to receive the response signal, to provide the first sampled value of the response signal to the reference voltage input at the beginning of the first sample period, and to provide the second sampled value of the response signal to the reference voltage input at the beginning of the second sample period.

44. (New) The device of claim 39, further comprising:

a second subsystem configured to reconstruct at least the first output signal into a continuous waveform.

45. (New) A method of measuring an evoked neural response using a cochlear implant comprising:

stimulating a portion of an auditory nerve to elicit an evoked neural response via an electrode array of an implanted subsystem comprising an amplifier having a reference voltage input and a signal input;

sensing a response signal corresponding to the evoked neural response using at least the electrode array;

sampling the response signal at a first time to obtain a first sampled value of the response signal;

providing the first sampled value of the response signal to the reference voltage input;

providing the response signal to the signal input; and

amplifying differences between the response signal and the first sampled value of the response signal at a plurality of times to thereby obtain a changing first output signal representing at least a first portion of an amplified version of the evoked neural response.

46. (New) The method of claim 45, wherein sensing the response signal corresponding to the evoked neural response using at least the electrode array comprises:

sensing the response signal corresponding to the evoked neural response using an extra-cochlear electrode and at least one electrode of the electrode array.

47. (New) The method of claim 45, wherein the first sampled value of the response signal is provided to the reference voltage input at the beginning of a first sample period, the method further comprising:

sampling the response signal at a second time to obtain a second sampled value of the response signal; and

providing the second sampled value of the response signal to the reference voltage input at the beginning of a second sample period.

48. (New) The method of claim 47, wherein the first output signal is obtained during a first sample period,

the method further comprising:

    during the second sample period, amplifying differences between the response signal and the second sampled value of the response signal at a plurality of times to thereby obtain a changing second output signal representing at least a second portion of the amplified version of the evoked neural response, and

    reconstructing at least the first and second output signals into a continuous waveform.

49. (New) The method of claim 45, further comprising:

    reconstructing at least the first output signal into a continuous waveform.

50. (New) The method of claim 45, wherein sensing the response signal corresponding to the evoked neural response using at least the electrode array comprises:

    utilizing one or more electrodes of the electrode array to sense the response signal.

51. (New) A device for measuring an evoked neural response in a cochlear implant comprising:

    means for stimulating a portion of an auditory nerve via an electrode array to elicit an evoked neural response via an implanted subsystem comprising an amplifier having a reference voltage input and a signal input;

    means for sensing a response signal corresponding to the evoked neural response using at least the electrode array;

    means for sampling the response signal to obtain a first sampled value of the response signal;

    means for providing the first sampled value of the response signal to the reference voltage input;

    means for providing the response signal to the signal input; and

    means for amplifying differences between the response signal and the first sampled value of the response signal at a plurality of times to thereby obtain a changing first output signal representing at least a first portion of an amplified version of the evoked neural response.

52. (New) The device of claim 51, wherein the means for sensing the response signal corresponding to the evoked neural response using at least the electrode array comprises:

means for sensing the response signal corresponding to the evoked neural response using an extra-cochlear electrode and at least one electrode of the electrode array.

53. (New) The device of claim 51, wherein the means for sampling the response signal samples the response signal at a first time to obtain the first sampled value of the response signal, and comprises:

means for sampling the response signal at a second time to obtain a second sampled value of the response signal.

54. (New) The device of claim 53, wherein the means for providing the first sampled value of the response signal to the reference voltage input comprises:

means for providing the first sampled value of the response signal to the reference voltage input at the beginning of a first sample period; and

means for providing the second sampled value of the response signal to the reference voltage input at the beginning of a second sample period.

55. (New) The device of claim 54, wherein the amplifying means comprises:

means for amplifying differences between the response signal and the first sampled value of the response signal at a plurality of times during the first sample period to thereby obtain the changing first output signal; and

means for amplifying differences between the response signal and the second sampled value of the response signal at a plurality of times during the second sample period to thereby obtain a second changing output signal representing at least a second portion of the amplified version of the evoked neural response.

56. (New) The device of claim 51, further comprising:

means for reconstructing at least the first output signal into a continuous waveform.